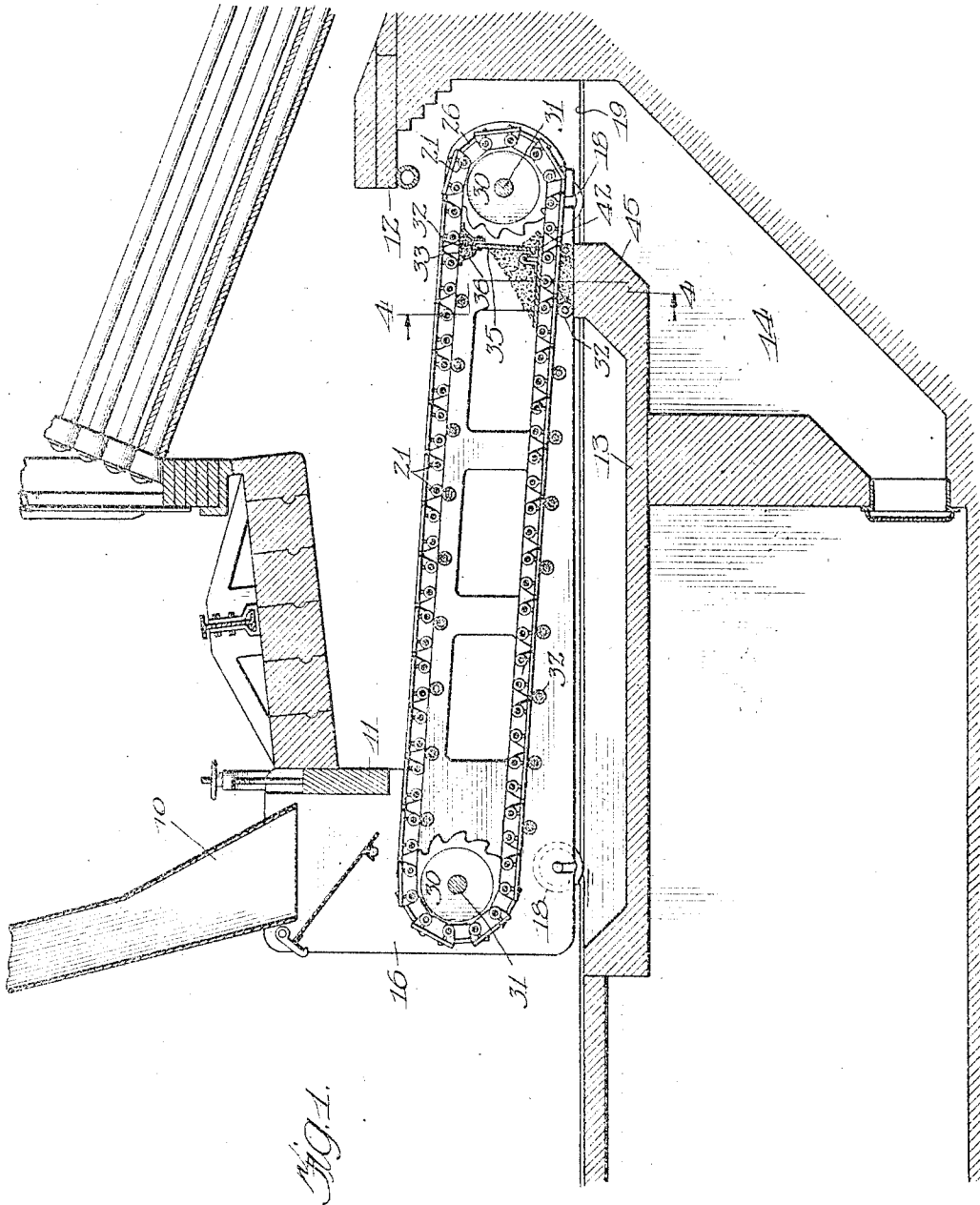


L. H. MAXFIELD.
CHAIN GRATE FURNACE.
APPLICATION FILED DEC. 24, 1908.

946,762.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

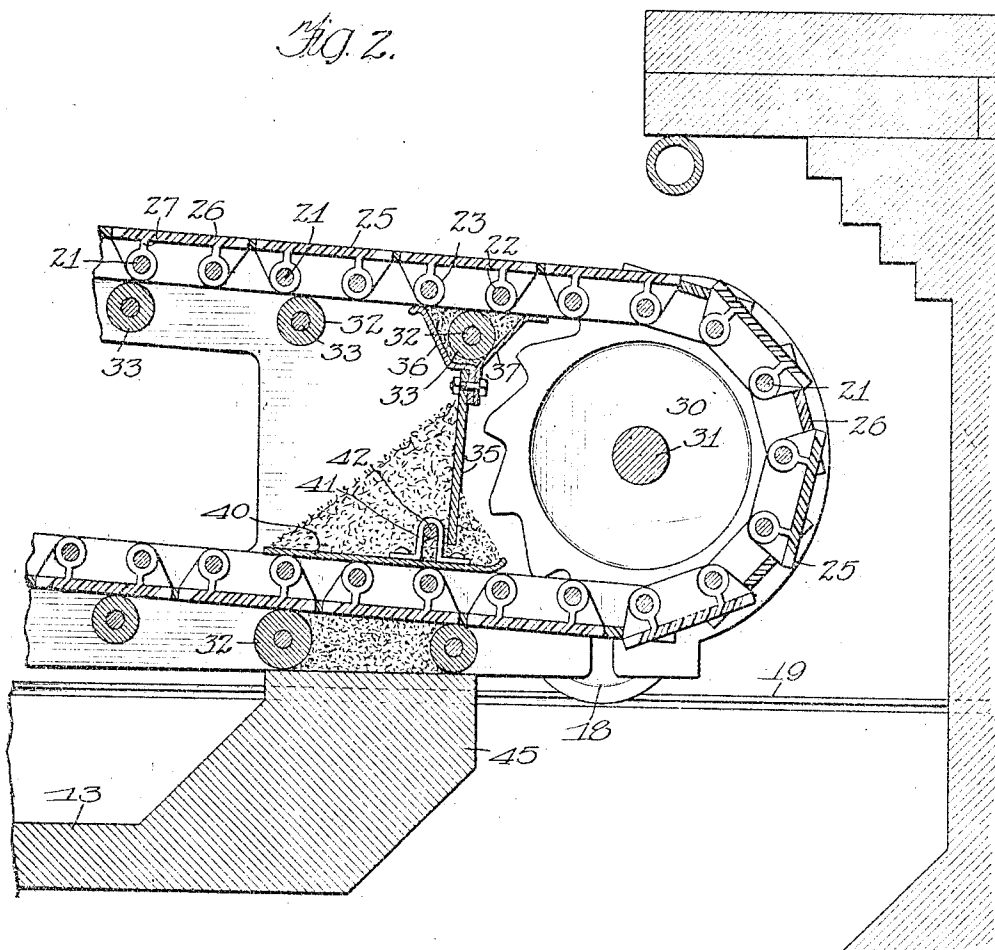
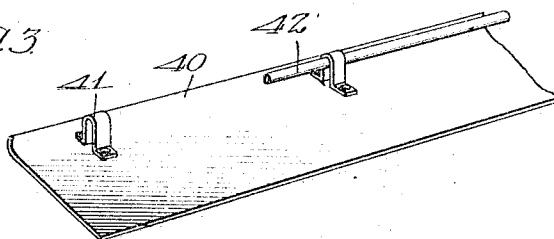


Fig. 3.



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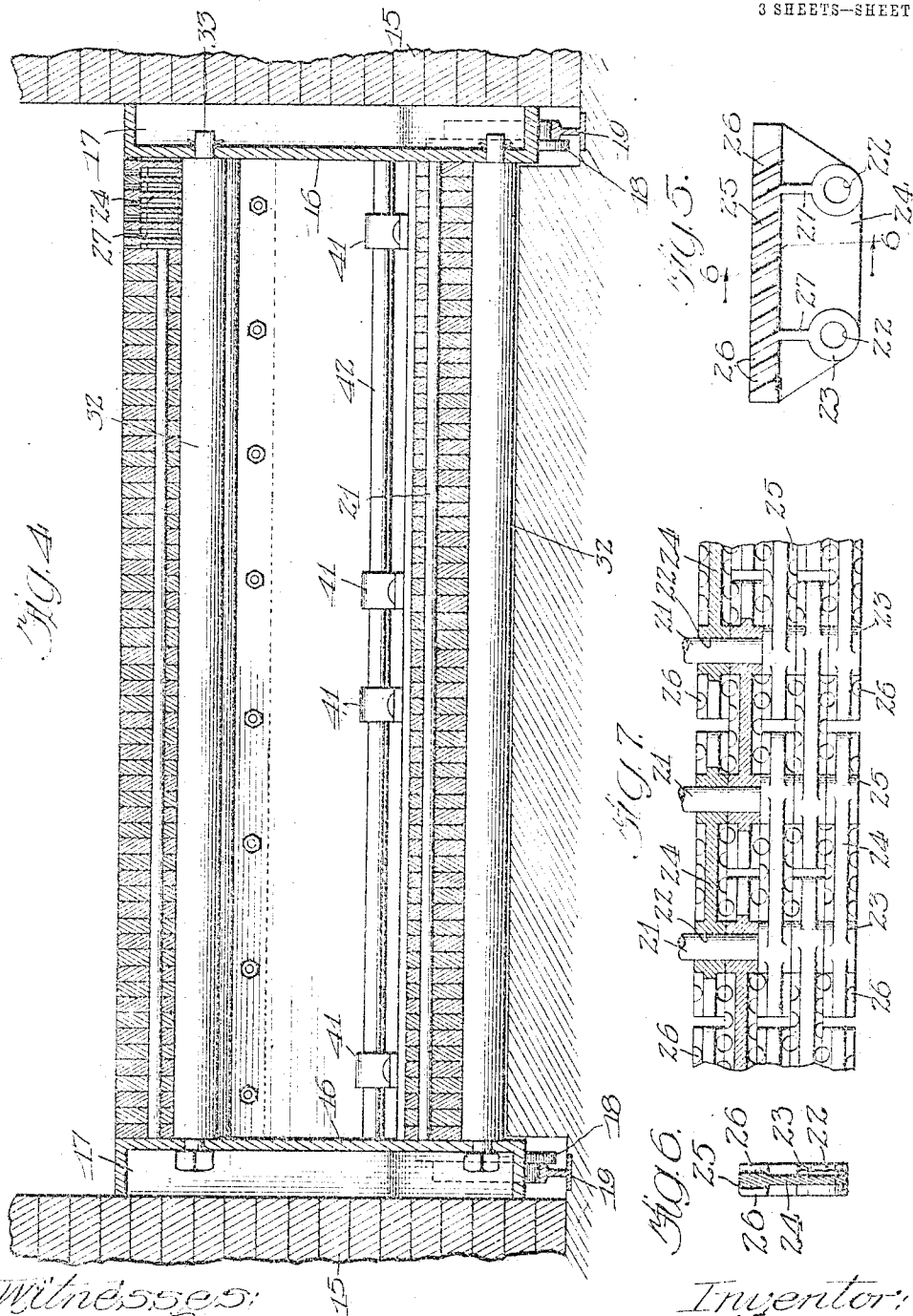
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

LEROY H. MAXFIELD, OF GODFREY, ILLINOIS, ASSIGNOR TO ILLINOIS STOKER COMPANY, OF ALTON, ILLINOIS, A CORPORATION OF ILLINOIS.

CHAIN-GRATE FURNACE.

946,762.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed December 24, 1908. Serial No. 469,058.

To all whom it may concern:

Be it known that I, LEROY H. MAXFIELD, a citizen of the United States, residing at Godfrey, in the county of Madison and State of Illinois, have invented a certain new and useful Improvement in Chain-Grate Furnaces, of which the following is a specification.

My invention relates to chain grate furnaces wherein the grate consists of a set of links pivotally connected together and adapted to travel continuously over sprockets or similar supports.

It will be understood that in chain grates the coal is fed from a suitable chute located near the forward end of the furnace. As the top of the grate moves inward, the coal is gradually heated, then consumed and finally, in rounding the inner end of the grate, the ashes are dumped off. The grate links "open up", as it were, in rounding the supporting sprockets at the inner end and consequently admit a great deal of air at this point which greatly retards combustion, for not only is an excessive amount of air admitted, but it is admitted at a point where it tends to check the draft and chill the gases.

The object of this invention is to prevent the passage of air at this point and to cause it to pass up through the grate during the earlier stages of combustion where it will tend to cool the links to prevent melting and will mix with the coal gas gradually to promote combustion. With this end in view I provide, first, a baffle between the top and bottom of the grate together with means for rendering the connection between the baffle and the links practically air tight; second, means on the side of the links for preventing the passage of air lengthwise through the links. Third, means for preventing the passage of air beneath the bottom or returning portion of the grate. Fourth, means for preventing the passage of air between the side of the links and the side frames, and fifth, means for preventing the passage of air between the side of the frame and the walls of the furnace.

I obtain my objects by the mechanism illustrated in the accompanying drawings in which:

Figure 1 is a sectional elevation of a grate embodying my invention. Fig. 2 is a sectional elevation of the inner end of the grate and its surrounding portions of the structure,

the drawing being to an increased scale. Fig. 3 is a perspective view of a baffle shoe employed at the inner end of the furnace. Fig. 4 is a transverse section of the furnace taken on the line 4-4 Fig. 1. Some of the grate bars or links at the upper right corner of this figure are in end elevation instead of being in section and hence hide the portion of the pivot rod passing through them. Fig. 5 is a side view of the preferred form of link. Fig. 6 is a transverse section of a link taken on the line 6-6 Fig. 5, and Fig. 7 is a bottom plan view partly in section of a portion of the upper grate.

Similar numerals refer to similar parts throughout the several views.

The furnace comprises in addition to the chain grate itself and the mountings thereof, a suitable chute 10 for supplying the coal, an adjustable gate 11 for regulating the amount of coal to be deposited upon the grate, a rear bridge wall 12, floor or platform 13, ash pit 14 and side walls 15. These parts present no special novelty in construction and may be considerably varied without departing from the spirit of the invention.

The grate proper is supported upon two side frames 16, which, near the rear end have a vertical rib 17 adapted to make contact with the walls 15 closely enough to substantially prevent the passage of air around them. Ordinarily the frame 16 will be provided with wheels 18 adapted to roll on tracks 19 so that the whole grate may be withdrawn bodily from the stationary setting for repairs.

The links 20 are articulately connected by means of rods 21 passing through apertures 22 located near each end and in the lower portion of the links. The links are arranged close together on the rods to occupy substantially the entire distance between the opposing inner faces of the side frames 16. This prevents lateral shifting of the links, and also prevents the coal from going to waste by dropping over the edges of the grate between the outside links and the side frames. The inside surfaces of the side frames are flush, that is, are plane surfaces, and the rods are of such length that their ends come close enough to the side frames to prevent the links from slipping off of them. In this way the frames themselves hold the links on the rods without the aid of cotter pins, nuts or any of the other devices com-

monly employed for this purpose. The preferred form of link is best shown in Figs. 5 and 6 where it will be seen that the apertures 22 are surrounded by bosses 23 which are the full width of the link at the widest part. A web 24 connects the bosses with each other and with the head 25 which is also the full width of the link and is provided with upwardly extending ducts or channels 26 for permitting the rise of air up through the link for cooling the latter and for supplying the coal with the amount of air required for combustion. Extending upward from the bosses to the head are vertical ribs 27 which are also the full width. When the links are assembled, obviously the boss, rib and head of one link will make close and continuous contact with the boss rib and head of the links on either side of it and thus will prevent air passing horizontally along between the links. But the ribs and bosses do not prevent the passage of air vertically upward through the links.

The grate itself is supported and travels around sprockets 30 supported upon axles 31 carried by the side frames 16. Intermediate of the sprockets the links are supported upon rollers 32 which are rotatable about rods 33 carried by the side frames 16.

Air is prevented from passing through the ends of the grate by means of a baffle which in its preferred form consists of a plate 35 arranged substantially vertically a slight distance forward of the rear sprockets, and extending from one of the side frames to the other. In its best form this plate does not make contact with the under edges of the upper links but terminates somewhat short of them and carries a trough consisting in the present instance of two diverging plates 36 and 37 having horizontal flanges at their upper edges for stiffening the plates and avoiding the danger of the links catching upon them. The advantage in this trough like formation is that ashes collect therein and form a yielding and constantly renewing seal which effectually prevents air from passing over the top of the baffle. In the present form a special seal is also provided between the baffle and the forwardly moving links at the bottom of the grate. This seal is shown in perspective in Fig. 3 and in operative position in Fig. 2. It consists of a shoe 40, extending from one of the side frames 16 to the other and is adapted to slide upon the forwardly moving links. Said shoe is held in position by means of straps 41 which ride loosely over the stationary bar 42 and permit the shoe to rise and fall and also rotate slightly with any unevenness in the links. The shoe is located beneath the stationary plate 35 and is purposely made of considerable width, measured from front to rear, so as to extend over two of the grate-supporting rollers. This

construction results in a closure at two places, to wit, at each of said rollers because at each roller, the roller makes contact on the bottom of the links and the shoe makes contact at the top and the side ribs 27 prevent the passage of air at any point between the bottom and top of the link. Another advantage of the construction is that the shoe will catch and retain a sufficient quantity of ashes to form a seal between the shoe and the lower edge of the plate. Reference to Figs. 1 and 2 of the drawing will show that as soon as the apparatus is in normal running order, ashes will collect at the top of the baffle and thus form a seal which will prevent air from passing rearwardly past the baffle. If one link or set of links should scrape an unusual amount of ashes from the trough 36, 37 other ashes will be immediately deposited and will refill the trough. The ashes upon the shoe 40 not only serve to stop the gap between the plate 35 and the shoe but tend to protect both the shoe and the plate from the heat of the burning.

Air is prevented from passing horizontally beneath the lower returning portion of the grate by means of a cross wall 45 which extends under two of the lower rollers 32 and coöperates with said rollers to form a receptacle for ashes to seal the space between the bottom of the grate and the floor of the furnace.

With the parts coöperating in the manner above described it will be seen that air is effectually prevented from passing beyond or even gaining access to the rear sprockets and consequently all the air which does pass must do so vertically through the top of the grate and the coal thereon through the ducts or channels 26 provided for the purpose. The distribution of the air is therefore practically uniform over the portions of the grate where combustion is taking place and the result is that the air is introduced in the most advantageous place for combustion, the mixing is more complete, and all excessive air is excluded from the flue gases except such amount as is advantageous to combustion.

In the accompanying drawings the air ducts 26 in the sides of the heads 25 of the links are shown to be oblique with respect to the length of the link. I do not herein claim a link having this characteristic as it forms the subject of a separate application filed on the 24th day of December, 1908, Serial No. 469,059.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a furnace, the combination of a chain grate wherein articulately connected links travel around supports at the front and rear, a stationary baffle located near the inner end of the grate and a shoe located at the

bottom of the baffle and adapted to ride
upon the lower grate run, said shoe being
adapted to lie approximately horizontally
for catching and retaining ashes, thereby
5 forming with the stationary baffle an air
seal.

2. In a furnace, the combination of a chain
grate wherein articulately connected links
travel around supports at the front and rear,
10 rollers beneath the lower grate run for sup-
porting it, one of said rollers being located
ahead of the other, and a wall located be-

neath said rollers and extending from one
to another thereof, whereby the rollers re-
tain ashes upon the wall for sealing the 15
space between the top of the wall and the
lower grate run.

In witness whereof, I have hereunto sub-
scribed my name in the presence of two wit-
nesses.

LEROY H. MAXFIELD.

Witnesses:

GEORGE D. DUNCAN,
WILLIAM M. DUNCAN.